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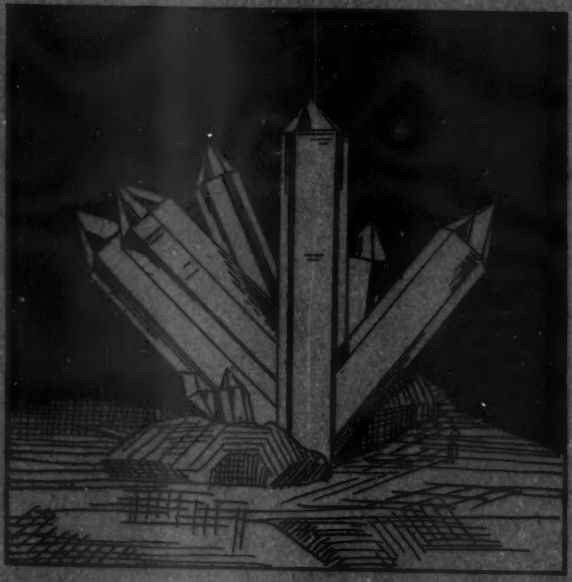
VOL. 9, NO. 12 WHOLE NO. 42

ROCKS AND MINERALS

A Magazine For Mineralogist, Geologist & Collector



OFFICIAL JOURNAL OF

THE ROCKS AND MINERALS ASSOCIATION

PUBLISHED MONTHLY

DECEMBER, 1934

THE BULLETIN BOARD

Important
Editorial Announcement

Owing to a greater cost of publication, it has become necessary for us to increase the subscription price of Rocks and Minerals, beginning January 1, 1935, to $1.50 a year for all new and renewed subscriptions after that date. We have been deferring this action for some time, but it is incumbent upon us to do this now, if we are to maintain for our subscribers the same well appearing magazine with increasingly interesting articles. When all subscriptions are upon the same basis, we hope to add somewhat to the number of pages and make the magazine of still greater value to its readers. Foreign subscriptions, new or renewed, after January 1, 1935, will be $1.75 per year.

All advertising contracts for the coming year will be accepted, until January 1, 1935 at the present prevailing rate. After January 1 the rates will be raised in accordance with the schedule printed below:

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As this is the last number of the year, and goes out to our subscribers just before the great holiday season, we take this opportunity to wish all readers of Rocks and Minerals a very Merry Christmas and a Happy and Prosperous New Year, especially thanking our many friends and supporters, some of whom have been urging us to increase the subscription price, for the words of encouragement and helpfulness they have sent us during the year.

ROCKS and MINERALS

A MAGAZINE FOR MINERALOGIST, GEOLOGIST AND COLLECTOR

PUBLISHED MONTHLY — FOUNDED 1926

VOL. 9, NO. 12 — WHOLE NO. 42

CONTENTS FOR DECEMBER, 1934

Entered as second-class matter September 13, 1926, at the Post Office at Peekskill, N. Y., under the Act of March 3, 1879

Specially written articles (as Contributions) are desired.

Subscription price $1.00 a year; foreign $1.25. Current numbers, 10c a copy. No responsibility is assumed for subscriptions paid to agents and it is best to remit directly to the Publisher.

Issued on the 1st day of each month.

ROCKS AND MINERALS — PEEKSKILL, N. Y., U. S. A.

The Official Journal of the Rocks and Minerals Association

ROCKS and MINERALS

Edited and Published by Peter Zodac

PUBLISHED MONTHLY

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Determination of Cat's Eye Gems

By GILBERT HART

Numerous ringstones or pendants are cut with a convex surface so that the gem shows a reflected band of light. The commonest of these have a rather flat dome, reflecting a broad yellow band in certain positions and yellow band in certain positions and are known as moon-stones or sun-stones. Rarer ones often have a higher cabochon cut and exhibit a single clear-cut line or ray of reflected light (chatoyancy) or several intersecting star-like rays (asterism). These are known as cat's eyes or asterias. Several minerals can be cut as cat's eyes, the resulting gem varying in value with the rarity of the stone and its beauty.

The cause of the cat's eye is directly due to the domed cut and the many symmetrical inclusions within the stone. It is an optical phenomenon depending on the total reflection at the polished surface of light rays which are reflected back from the inclusions and eventually are dissipated within the stone or lost behind the back of the gem.

Exact determination of the mineral of cat's eyes is possible by a few simple tests, carried out by instruments which are essential in any gem determination. The hardness test is made by scratching with the typical points of the Mohs scale. The index of refraction is determined by use of the Smith refractormeter, and in this instrument one can see the birefringence. Usually several positions of the stone on the stage are required to observe the maximum birefringence, which in most cat's eyes is in the plane at right angles to the ray of the eye. Specific gravity can be measured by weighing or by heavy liquids. This test and usually the hardness test, is made after removal from the setting. Dichroism tests can be made in the dichroscope for checking the use of the following key.

The exact procedure for these tests is to be found in most mineralogical texts, or in J. H. Smith's "Gem Stones." The key is used after performing the tests by noting which heading conforms to the gem at hand. Thus a Sapphire Cat's Eye is not "H under 6.5" but is in the second division "H over 6"; its index places it in the second group of "Index under 2.00"; its S.G. is 4:05 so it falls in the second class of this group, and is definitely located as a corundum gem. Now turning to the corundum heading, we find that it corresponds with the detailed description of this mineral. Further analysis of the cat's eye varieties of corundum show that this blue stone could be called Sapphire Cat's Eye or Cat Sapphire.

In the check descriptions of the minerals the following method is used in recording constants. First the typical value is given, then the observed limits in gem varieties. Abbreviations are H for hardness, G for specific gravity, I for index of refraction, B for birefringence, L for luster, D for dichroism.

KEY FOR DETERMINING CAT'S EYE GEMS

Cabochon cut stone gives a single ray of reflected light ..... Cat's Eye
- H under 6.5
  - B under .010
    - I low, under 2.00
      - Very soft ..... Gypsum
      - H over 3
        - G 2.60 ..... Nephelite
        - G 2.70 ..... Labradorite
        - G 3.16 ..... Enstatite
    - I high, over 2.00 ..... Limonite
  - B over .010
    - I low, under 2.00
      - G 2.60 ..... Serpentine
      - G 2.93 ..... Aragonite
      - G 3.45 ..... Hypersthene
    - I high, over 2.00 ..... Hematite
- H over 6
  - Index low, under 2.00
    - G under 3.00
      - H under 6.5 ..... Labradorite
      - H 7 or more
        - Index 1.54 to 1.56 ..... Quartz
        - Index 1.56 to 1.60 ..... Beryl
    - G over 3.00
      - G 3.5 to 3.9 ..... Chrysoberyl
      - G 3.9 to 4.2 ..... Corundum
  - Index high, over 2.00 ..... Hematite

Cabochon cut stone gives several stellated rays, usually six—Asteria
- G 2.5 to 2.8 ..... Quartz
- G 3.5 to 3.9 ..... Chrysoberyl
- G 3.9 to 4.2 ..... Corundum

LIST OF CAT'S EYE GEMS

Gypsum

H—1.5 - 2
G—2.32; 2.2 - 2.4
I—1.52 - 1.53
B—0.009
L—Pearly to Subvitreous
D—Weak to None

Very soft; rarely used as gem but occasionally as an ornamental; usually with fibrous structure and pearly opalescence when so used.

Nephelite

H—5.5; 5 - 6
G—2.60; 2.55 - 2.65
I—1.53 - 1.54
B—0.004
L—Greasy
D—Very Weak

Rare as a gem, then usually an oily green color in the variety alaeolite.

Labradorite

H—5 - 6.5
G—2.70; 2.68 - 2.72
I—1.56 - 1.57
B—0.009
L—Vitreous
D—None

Usually bluish gray with often a sheen rather than a typical cat's eye. Not common.

Enstatite

H—5.5; 5 - 6
G—3.16; 3.1 - 3.5
I—1.66; 1.65 - 1.67
B—0.009
L—Vitreous to Metalloidal
D—Weak

Rare as a gem—Varieties are:
Light-colored—Enstatite
Green to Brown—Bronzite
Bronzy Luster—Altered Enstatite
Bastite
Schiller Spar

Limonite

H—5 - 5.5
G—3.80; 3.0 - 4.0
I—2.0 - 2.5
B—None
L—Silky to Submetallic
D—None

Very rare. Usually dark colored.

Serpentine

H—4; 2.5 - 6
G—2.6; 2.2 -- 2.8
I—1.50 - 1.58
B—0.013
L—Greasy
D—Weak

Usually in shades of green; rather too soft for a personal gem. Varieties are:
Luster greasy
Color green—Serentine Cat's Eye
California Cat's Eye
Satelite
Color brownish—Calif. Tiger Eye
Luster bronzy, color brown
Bastite
Schiller Spar

Aragonite

H—3.5 - 4
G—2.93; 2.84 - 3.0
I—1.53 - 1.68
B—0.155
L—Vitreous
D—Weak

A common ornamental, usually in pale color. Chatoyant varieties rather unusual.

Hypersthene

H—5 - 6
G—3.45; 3.1 - 3.5
I—1.70; 1.67 - 1.73
B—0.013
L—Pearly to Metalloidal
D—Strong

Not common as a gem; usually greenish to brown.

Hematite

H—5.5 - 6.5
G—5.2; 4.2 - 5.3
I—2.71 - 3.22
B—0.160 - 0.280
L—Metallic
D—Weak

Dark red to black, very rarely chatoyant.

Quartz

H—7
G—2.65; 2.50 - 2.80
I—1.55; 1.54 - 1.56
B—0.009
L—Vitreous
D—None

Commonest of Cat's Eyes.
Varieties are:
Asterias—Asteriated Quartz
Star Quartz
Star Stone
Starolite

Cats Eyes—Quartz Cat's Eye
Schiller Quartz

Color blue—Crocidolite
Crocidolite Cat's Eye
So. African Cat's Eye
Wolf's Eye
Wolf's Eye Stone

Color greenish—
Hungarian Cat's Eye
Occidental Cat's Eye

Color gray—Hawk Eye
Hawk's Eye

Color brown to yellow—
Tiger Eye
Tiger's Eye

Beryl

H—7 - 8
G—2.69; 2.6 - 2.91
I—1.58; 1.56 - 1.60
B—0.007
L—Vitreous
D—Distinct

A very unusual cat's eye.

Chrysoberyl

H—8.5
G—3.65; 3.5 - 3.84
I—1.74 - 1.76
B—0.009
L—Vitreous
D—Very strong

Most beautiful of the usual cat's eyes, often called the only true variety; has a very clear-cut ray; in cymophane the star is of short thick rays resembling a spot of light. Varieties are:
Asteria—Cymophane
Floating Light

Cat's Eyes—Color greenish—
Precious Cat's Eye
Oriental Cat's Eye
Ceylon Cat's Eye

Color changes in artificial light.
Alexandrite Cat's Eye

Corundum

H—9
G—4; 3.9 - 4.16
I—1.75 - 1.77
B—0.009
L—Adamantine to vitreous
D—Strong

A common Cat's Eye, notable for its superior hardness and varied coloration; the only common asteria.
Varieties are:

Asteria—Asteria
Asterie
Sagenitic Corundum
Star Stone

Color red—Star Ruby

Color blue—Star Sapphire
Asteriated Sapphire

Color yellow—Star Topaz

Cat's Eye—Oriental Cat's Eye
Oriental Moonstone
Oriental Sunstone

Color red—Ruby Cat's Eye
Cat's Eye Ruby

Color pink—Pearl Corundum

Color blue—Sapphire Cat's Eye
Cat's Eye Sapphire
Cat Sapphire

Color yellow—Topaz Cat's Eye
Girasol
Bronze Corundum

Adventures of a Museum Curator

By A VETERAN CURATOR

The public in general does not know anything about the functions of a curator. The word itself often makes one inclined to rush to the dictionary shelf, and I have even had the unique experience of meeting up with the simple soul who said "So you are a curator. What do you cure?"

I can assure you however that the activities of a museum curator are distinctly NOT all covered by a dictionary definition, even if one were to refer to the very newest and finest one that only came out a month or so ago. An unkind critic once said that a museum curator should combine the acquisiveness of a rag-picker with the moral outlook of a second story man; but this I think is rather stretching the truth.

In the course of a fairly long career as the curator in charge of several mineral collections, it has been my lot to happen upon a number of odd circumstances, and since I find it entertaining to read about such happenings in fiction, or to listen to them over the radio, it occurred to me that the readers of ROCKS and MINERALS might find them amusing.

A number of years ago I had charge of a mineral collection in which the displayed specimens were ranged on white painted steps under inclined glass lids, a very admirable arrangement, since everything could be seen with the minimum of back strain. One day I noticed a spot on the white step among the quartz specimens where the paint had been charred exactly as though

one had left a lighted cigarette to burn itself out while lying on the painted shelf. But I knew that no cigarette of mine had marred the virgin whiteness of this shelf, and how could the casual cigarette-smoking student who sometimes wandered into the mineral collection burn a hole through a plate of glass. It seemed to be just one of the unsolvable mysteries. Finally I thought of good old sol and the three-inch rock crystal ball, and the emigma was solved. The rock crystal ball was of just the right size as it rested on the shelf to focus the rays of the early morning sun on the burnt spot. The combination might even have started a fire, and then we would indeed have had a headline thriller such as "Crystal gazer's ball fires famous collection."

Another experience that I encountered happened later in connection with the same type of museum exhibition case. A colleague came to me with a harrowing tale about heaps of graphite flakes which he was exhibiting in a line of glass, saucer-like dishes. The heaps of graphite would not stay in the dishes, but insisted on getting out in some mysterious way, at least some of the graphite did, and spreading in dirty little crescents in front of the glass saucers exactly where it would be most easily noticed. Here was a real mystery, no draught of air, such as would be caused by the opening and closing of the case lid, could possibly spread the stuff so evenly and in just such a pattern. The thing worried us for days, and there seemed to be absolutely no way in which it could happen. But there was. One morning I looked at the graphite case just after the floorman had cleaned the glass for the day, and, believe it or not, the graphite had been pulled right out of its saucer by the electric charge communicated to the glass lid by the wet chamois leather rag wielded by the brawny arm of the janitor and was sticking to the under side of the glass. Of course it did not "stay put" on the glass, for, as soon as the electric charge dissipated, it collapsed onto the shelf, but not on the place it started from. Since the glass was set at an angle, gravity laid it down in exactly that neat crescent that had puzzled us in front of the original heap.

Every mineralogist has one or more meteorite stories like the two-hundred pound mass of granite, which falling from the skies upon a two masted schooner, passed through the deck but was providentially arrested by some unknown cosmic force, from also going through the bottom of the ill fated "hooker" and ultimately stopping only at the bed of the sea.

One of my most satisfactory experiences in connection with an alleged meteorite began when a rural veterinary arrived in my office with a roundish object, in size somewhere between a golf ball and an apple. His story was circumstancial but unconvincing. He was standing just inside his barn door when he heard a distinct rap upon the roof, and stepping out found the messenger from the stars lying on the ground at his feet. What else could it be but a meteorite? I suggested that the outside of the thing looked organic and that I had heard of such things as calcui formed in the insides of animals. I did not tell him that I suspected his cow as a meteorite producer, but I had that thought. After some debate we decided that the matter should be settled by cutting the object in question in two, and before turning it over to our machinist, I drew a line around it in red pencil for him to follow with his saw. I was lucky, for when the two halves were returned to me, it was found that the band saw had exactly divided the wire nail in the middle of the supposed meteorite. As I subsequently pointed out to my friend, the veterinary, if the thing was not a stomach calculus, but a meteorite, why then the gates of Heaven must be put together with wire nails.

Diamond Finds in the United States

By EUGENE W. BLANK, *Scientific Editor "Rocks and Minerals"*
Colgate-Palmolive-Peet Company, Jersey City, N. J.

PART III.

Diamonds in California

Diamonds have been found in a number of localities of California, invariably in stream gravels while working them for gold. The princial districts have been: Volcano in Amador County; Placerville, Smith's Flat and others in El Dorado County; French Corral, Nevada County; Cherokee Flat, Morris Ravine, and Yankee Hill, Butte County; Gopher Hill and upper Spanish Creek, Plumas County. The most productive district of recent years has been Cherokee in Butte County. [25] [26] [27] [28] [29] [30]

I quote from a letter by W. W. Bradley, State Mineralogist of California, "There has probably been one or more diamonds found every year, but these finds do not always become of public record. Butte County has been the most prolific producer. It was reported by William Fliedner, R. 1, Oroville, California, that two diamonds were found in that county in 1931.

"A newspaper clipping from Oroville dated July 21, 1931, states that another diamond has been found at the famous Cherokee Mine by Pete Felthausen, a prospector, which weighed half a carat, and Mary Jackson found one during the same year, weight: two carats 27 points, which was sold to a Mr. Duncan of Oroville."

Diamonds were reported in California as early at 1849 when Lyman[31] described a pale yellow crystal about the size of a small pea, which came from one of the placers. This specimen was of pale straw color with convex faces. Several years later diamonds were observed in the gold gravels at Cherokee, Butte County, and this locality has become noted for the number of stones found.[32] A total of 400 to 500 stones have been discovered throughout the state. A few of the stones found are over two carats in weight and of good quality but the majority show a yellow tinge.

The mode of origin and sources of the diamond remain undiscovered; they are found only in placer gravels, in placer concentrates and in the so-called "black sands." It is believed that their origin lies in the basic igneous rocks from which the serpentines of the gold regions have been derived.

Hanks[33] describes the finding of diamonds during the early days of gold mining.

Eakle[34] gives the following list of stones and their place of discovery:

"Amador County: A few small stones have been picked up near the towns of Volcano, Oleta and Fiddletown.

"Butte County: In 1853 it was discovered that diamonds occurred in the gravels at Cherokee Flat, about nine miles north of Oroville. More than three hundred good diamonds have been obtained from the placers in this district and it leads all other districts

25 California Mineral Production, Bulletin No. 105, Dept. of Natural Resources, Division of Mines, California, p. 103 (1930).

26 Wilson, "Great California Diamond Swindle," Overland Vol. 43, 291 (1904).

27 Evans, "Diamonds of Smiths Flat, California." Eng. and Mining J., Vol. 102, 814 (1916).

28 Scott, "Diamond Quest in California," Sci. Am., Vol. 134, 312 (1926).

29 Turner, "Diamonds of California," Am. Geol., Vol. 23, 182 (1899).

30 Kunz, "Gems, Jeweler's Materials and Ornamental Stones of California," Bulletin No. 37, California State Mining Bureau.

31 Lyman, "Platinum and Diamonds in California," Amer. Jour. Sci. Vol. 8, 294 (1849).

32 Eakle, "Minerals of California," California Mining Bureau Bulletin No. 91, p. 7 (1923).

33 Hanks, 4th Annual Report of the State Mineralogist, California (1884).

34 See reference 32.

in the State. It seems quite probable that the source of these diamonds is not far from this vicinity . . . Some have also been found in the placers at Thompson Flat, two miles north of Oroville.

"El Dorado County: A diamond weighing 1¼ carats was found at Forrest Hill. About sixty have been found near Placerville, namely, on Webber Creek in White Rock canyon and at Smith's Flat.

"Fresno County: Small diamonds are reported to have been found a few miles north of Coalinga.

"Imperial County: Some small diamonds are said to have been found near the San Diego border.

"Nevada County: A 1½ carat stone was found at French Corral.

"Siskiyou County: Diamonds occur in the placer gravels at Hamburg Bar.

"Trinity County: Microscopic examinations of the black sands of Trinity River and some of the tributaries have shown the presence of small diamonds as a constituent of these sands."

A brief descriptive list of stones found between 1859 and 1913 is given in "Mineral Resources of the United States" for 1917.[35]

The first diamond from the Cherokee district was reported in 1853.

Turner[36] gives in addition to the counties already mentioned as sources of diamond occurrences the counties of Tulare and Del Norte. Of the eight counties in which diamonds have been found, Del Norte and Trinity stand apart, in the northwestern portion of the State. They have yielded only minute stones in the sands of Smith River and Trinity River respectively.

Tulare County is represented by one diamond which was discovered in Alpine Creek.

Nevada County has yielded the largest stone, one of 7¼ carats being found (up until 1900).

Diamonds in Oregon and Washington[36]

No commercial deposits of diamond are known to exist in Oregon but it is a matter of record that they are found from time to time in the gold placer operations. No authentic record is available of all the diamonds which have been found in past time but the number would probably be near to 100 stones. A few stones of good quality up to three carats in size have been found and a few, larger stones of inferior quality. The majority of the stones found are less than three carats in weight.

The existence of diamonds in Oregon seems to be confined to the southwestern portion of the state. Authentic occurrences elsewhere in the state are not recorded. In southwestern Oregon peridotic rock formations similar to those of Kimberlite, Africa occur at numerous places. It is assumed that the diamonds have so far been found in their original matrix.

In the black sand deposits along the Oregon coast have been found microscopic diamonds in varying amounts. The origin of the minute diamonds found in the black sands is doubtless that of the larger stones found further inland from the coast.

Most of the diamonds found in Oregon are of a yellowish color and as a rule are not free of flaws.

Few diamonds have been found in the state of Washington. In the northeastern part of the state, along the coast, in the black sand deposits, microscopic stones are said to be found.

In October, 1932, a diamond of a little over four carats weight was found in Skamania County, Washington. The stone was a good octahedron, of a pale yellow color and free of marked flaws. This stone was found in connection with a placer operation. It was examined by a local gem stone cutter (specimen not seen by Dr. Dake) and was verified to be a real diamond. The stone was finally sent to a facet cutter in San Francisco for cutting.

Diamonds in The Canyon Diablo Meteorite, Arizona

According to Crookes[37] the suggestion that diamonds are of meteoric origin was first made by Meydenbauer who says: "The diamond can only be of cosmic origin, having fallen as a meteorite at later periods of the earth's formation. The available localities of the diamond contain the residues of not very compact meteoric masses

35 "Mineral Resources of the United States," United States Geological Survey, Washington, Part 2, p. 849 (1917).

36 Most of the information under this heading was communicated to the writer by Dr. H. C. Dake, President of the Oregon Agate and Mineral Society, Portland, Oregon.

37 See reference 4.

which may, perhaps, have fallen in historic ages, and which have penetrated more or less deeply, according to the more or less resistant character of the surface where they fell. Their remains are crumbling away on exposure to the air and sun, and the rain has long ago washed away all prominent masses. The inclosed diamonds have remained scattered in the river beds, while the fine, light matrix has been swept away."

On the basis of this hypothesis, the so-called volcanic pipes in which the diamonds are found are simply holes bored in the earth by the impact of gigantic meteors.

The discovery of diamonds in the Canyon Diablo meteoric iron was first announced by Dr. A. E. Foote.[38] He found in the cutting of this meteorite that it was of extraordinary hardness, a day and a half of time being consumed and chisels destroyed in the process of removing a section. The emery wheel used in the process was ruined.

Huntington[39] dissolved one hundred grams of the meteorite in acid. There remained a small amount of white grains which resisted the action of the acids. These particles when separated by hand had the appearance of fine beach sand. Under the microscope they were found to be transparent and of brilliant luster. They cut glass, topaz and a polished sapphire.

Friedel[40] repeated the experiment in a modified form using a 34 gram sample. He burnt some of the black residue and obtained carbon dioxide gas.

As a result of these experiments the presence of diamonds in the Canyon Diablo meteorite was amply confirmed. Subsequently it was found that the meteorite contained the three varieties of carbon—diamond (transparent and black), graphite and amorphous carbon. Up to the present time only microscopic diamonds have been obtained from the Canyon Diablo meteorite[41 42].

38 Foote, Am. J. Sci., Vol. 142, 413 (1891).

39 Huntington, Science Vol. 16, 15 (1892).

40 Friedel, Bulletin de la Societe Francaise de Mineralogie Vol. 9, 258 (1892).

41 Merrill, "Composition and Structure of Meteorites," Smithsonian Institution Report, p. 175 (1917).

42 Barringer, "The Most Fascinating Spot on Earth," Sci. Am., 137, 52, 144, 244 (1927). A series of 3 popular articles on Meteor Crater, Arizona and the attempt being made to reach the main body of the meteor.

It must not be thought that diamonds are peculiar to the Canyon Diablo meteorite alone. On the contrary carbon in the form of graphite, both crystalline and amorphous is a common constituent of meteorites, particularly the iron-rich varieties, where it occurs in disseminated scales and nodular masses of considerable size[43]. Usually the amount of carbon is low but the Novo-Urei stone (Russia) was estimated to contain some 1.26% of amorphous carbon, and 1% in the form of diamond. The Novo-Urei stone fell in Penza, Russia in 1886. Diamonds have also been found in a stone that fell at Carcote in Chile. Graphitic carbon found in meteorites in cubic form (cliftonite) is believed to be altered diamond.

Miscellaneous Finds of Diamonds

F. W. Packer has claimed the discovery of a diamond weighing 2¼ carats in Montgomery County, Texas. The stone was badly flawed.[44]

In 1901 a diamond of 4¼ carats was found in Alabama, in Shelby County, about 30 miles south of Birmingham. It was found by a little girl in earth used to fill low spots in a garden. It was estimated that the stone would cut into a gem of 1½ carats or slightly more.[45] One stone has been found in Lee County, Alabama.[46]

The State Geologist of Alabama, Mr. W. B. Jones reports only one reference to diamonds in Alabama (reference untraced by the writer).[47] The extract follows: "I can tell you another thing; diamonds have been found in Alabama; they are found either in Coosa County or Randolph County; but I think it is Coosa. I knew a gentleman who found a diamond from there worth about $300 or $400, and it has been tested by experts who said it was a diamond. The diamond matrix in South Africa is a carboniferous slate, and from this you get the dia-

43 Merrill, "Composition and Structure of Meteorites compared with that of Terrestrial Rocks," Smithsonian Institution Report, p. 175 (1917). Contains a brief account of diamonds in the Canyon Diablo meteorite.

44 "Mineral Resources of the United States," United States Geological Survey, Washington (1911).

45 Ibid., (1901).

46 "Mineral Resources of the United States," United States Geological Survey, Washington, p. 731 (1905).

47 Mr. Jones states: "I have searched through our literature as best I can, and find only one reference to diamonds in Alabama, and that is a rather indefinite one."

mond; the same mineral has been found in Kentucky, but there seems to be no diamonds there." This is apparently an extract taken from an old source.

Mr. Jones also reports that diamonds are said to occur in the Cahaba Coal Field.

Several finds have been attributed to Tennessee.[45]

There is no authentic record of the occurrence of diamonds or peridotite in New Mexico. Many years ago a diamond was reported from gravels near Santa Fe but recent inquiries have failed to locate the stone or its actual source.[48]

Peridotite occurs near Querida, Custer County and in Boulder County, Colorado but no diamonds have ever been observed.

Cattelle refers to a magnificent brown stone of one carat weight found near Philadelphos, Arizona but Dr. Butler, Dean of the College of Mines and Engineering, University of Arizona, claims no diamonds have been found in the state.

The only authentic record of diamond finds in Michigan is an 11 carat diamond found at Dowagiac in 1894 in glacial drift by F. B. Blackmond. Obviously this was a "Float" brought in by the ice during the glacial invasion. There is a peridotite area in the vicinity of Marquette and also a few miles north and northwest of Ishpening in Marquette County. The area northwest of Ishpeming contains gold and silver, but as yet there has been found no evidence of diamonds.

Montana, contrary to popular belief, has no record of authentic diamond finds.

A microscopic diamond has been reported from a peridotite dike near Syracuse, New York. The diamond was found by Frank Brainerd, a graduate student of Syracuse University during the academic year of 1920-1921. The diamond was very small, transparent and white in color. No other diamonds have been found in the vicinity.

48 Private communication from T. P. Wootton, Librarian and Statistician, New Mexico School of Mines, N. M. Rocks similar to peridotite are known on the Navajo Reservation, west and north of Gallup, mostly on the Arizona side of the line. These rocks are described in detail in U. S. Geological Survey Professional Paper 93, "Geology of the Navajo Country," by H. E. Gregory.

Diamonds in Arkansas[49]

On August 1, 1906, John M. Huddleston picked up two stones near the mouth of Prairie Creek, two and one-half miles southeast of the little town of Murfreesboro, Pike County, Arkansas. The specimens were exhibited to several experts, among them the redoubtable George F. Kunz, who identified the stones as real diamonds. The finding of these stones led to further exploration and it was soon definitely proven that this was the first discovery of diamonds in their matrix in North America. The matrix of the diamonds was an igneous rock known as peridotite. The discovery of the diamonds caused such excitement that other areas of peridotite were soon brought to light. To the present time three others, the Kimberlite, American and Black Lick areas, have been revealed and diamonds have been found on all except the latter. The exposure at which diamonds were first discovered is known as the Prairie Creek area. This is an old exposure of the rock which had been known to geologists as early as 1842. (To be Continued)

49 There exists very extensive and comprehensive literature dealing with the Arkansas diamond field, part of which follows:

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Lanier, "Has Arkansas a Diamond Field?", Review of Reviews Vol. 36, 301 (1907).

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"Diamonds in American Gravels," Sci. Am., Vol. 146, 119 (1932).

Branner and Brackett, "The Peridotite of Pike County, Arkansas," Am. Jour. Sci., Vol. 38, 50 (1889).

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Sterrett, "Diamonds in Arkansas," U. S. Geological Survey, Mineral Resources, p. 23 (1909)

Glenn, "The Arkansas Diamond Bearing Peridotite," Geological Society of America, Bulletin No. 23, p. 726 (1912).

Miser, "New Areas of Diamond Bearing Peridotite in Arkansas," U. S. Geological Survey, Bulletin No. 540, Washington (1914).

Miser, "Peridotite Dikes in Scott County, Arkansas," U. S. Geological Survey, Bulletin No. 735-h, Washington (1923).

Mineral Collecting in the Vicinity of Paris, Maine

By PRESTON E. CLOUD

During the last two weeks of August, 1934, the author, accompanied by Mr. Lester Clark of Washington, D. C., made a mineral jaunt through Pennsylvania, New Jersey, and the New England states. We prospected all the likely places enroute and were fortunate enough to find some fine epidote, piedmontite, and native copper in Adams County, Pennsylvania. Through the courtesy of Mr. McCann of the New Jersey Zinc Company, we were permitted to visit their plant at Franklin and watch the most amazing assortment of minerals that ever came over a picking table. I could bore you with a list of over a hundred different minerals occurring at the famous Franklin Furnace, but it will suffice to say that we made a fine collection, securing some beautiful fluorescent pieces and crystal groups. However, from the point of sheer fun and interest to the collector who loves to grub for his specimens, we found our all too short four days in the Paris, Maine, vicinity the most satisfactory.

Our first glimpse of the famous Maine pegmatites was along the shore of Lake Sebago, where thin dykes, riddled with garnets, cut many of the large boulders. That same evening we arrived in Norway, Maine, with two flat tires and a load of rocks. A pleasant lake attracted our eye, so in the remaining hours of daylight we searched for and found a camping place. There, on the shore of Lake Pennesseewassee, I enjoyed one of the pleasantest four day periods of my life. We had a splendid camp site in a fine grove of pines, and, after the day's collecting, could spread our material out and examine it at leisure while the lingering aroma of bacon and beans promised staunch refreshment to healthily tired bodies. Perfect weather and a full moon dancing over the lake and peeping through the pines made the evenings by the camp fire periods of utter pleasure. Then, a good sound sleep on a bed of fragrant pine needles, topped with a morning dip in the steaming lake, prepared us for the

Franklin, N. J. One of the world's greatest mineral localities. Note mine shaft on right.

next day of the mountain goating it over the dumps of nearby feldspar mines.

Mt. Mica, of Tourmaline fame, was the first and main object of our trip. About a mile and a half east of Paris Village, a small hill rises to an elevation of about 900 feet, this is Mt. Mica. It was discovered to be a source of tourmaline in the year 1820 and prospected sporadically by various mineralogists and commercial mica and feldspar companies until the present time. The original diggings have long since been abandoned, but a smaller cut below is being worked for feldspar and has furnished material for a glory road of shining muscovite flakes to the Paris post road. Indeed, any of the quarries in that vicinity may be tracked down by following the dump material used for road filling. We picked up interplaned crystals of muscovite that were dazzling in their brilliancy.

The old dump at Mt. Mica covers a large part of the hill top and is much overgrown with brush. When you approach it you stand upon a bank of schist which marks the former line at which the pegmatite material began. It was in the area immediately below the schist capping in which the richest gem bearing pockets were found. The dump itself is a marvel, great chunks of rock are piled sky high and everyone is criss-crossed with huge crystals of black tourmaline and peppered with garnets of the almandite variety. After a whole morning's hard work digging and chipping we finally found a large area of loose sand which seemed to be fairly rich in green tourmaline crystals. We found some fine, loose crystals, although very small, and a number of specimens of perfect crystals of tourmaline which were closely intergrown with lepidolite and quartz crystals.

On the second day we started out in another direction toward Greenfield. Here, on a hiltop about two miles north of Lake Pennessewassee, we found an old abandoned feldspar mine which yielded some opaque beryl, crystalline and massive; some beautiful rose quartz; and a few very interesting almandite crystals which on examination proved to be very badly distorted but complete, trapezohedrons. Here we also found some badly shattered crystals of green apatite which later proved to be beautifully fluorescent, showing a rich golden yellow under the mercury vapor lamp. Some pieces luminesced after exposure to the light. The presence of flakes of autunite in the same feldspathic mass with the apatite was indicated by an eery green fluorescence under the violet ray.

Another locality visited was on a hillside about two miles northwest of Lake Pennessewassee on the Greenfield road. Here two open cut diggings, one being worked for feldspar, assumed the proporions of huge pits, for they were cut straight down and had to be entered by ladders. At this locality were found some of the most interesting mineralogical specimens of the trip. Complete hexagonal quartz crystals, 25 centimeters long and 10 centimeters wide, were so flattened as to be as thin as an ordinary book cover; small crystals of parallel growth were numerous along the sides of the large flat ones. Here too we found great heaps of interplaned biotite crystals, one of which was penetrated in turn by a flattened quartz crystal along the sides of which were plates of muscovite. Huge chunks of rock were composed entirely of small garnets; fine crystals of beryl grew in the feldspar; fluorescent apatite and autunite were found; the pink kaoline, montmorillonite was common; and the lithia mica cookeite was plentiful in masses composed of tiny, lilac colored, six sided prisms often intergrown with fine small crystals of green tourmaline.

On the final day of our stay in the Paris vicinity we visited the Bennett feldspar mine near Buckfield on the Buckfield-Paris Hill road. This is a fine clean quarry recently opened and being actively worked. Here we threw the rest of our beryl away for we found the finest specimens of the trip. Crystallized and massive beryl of a fine aquamarine color was common in the walls of the mine and on the dump. A recent blast had shaken loose a great chunk of massive beryl and unfortunately broken it into a number of pieces and shattered it badly. One piece about the size of a nail keg, of a fine color and showing slickensided surfaces and a growth of fine hairlike black tourmalines, will be placed on exhibition in the near future by the

Bennet Feldspar Mine near Buckfield, Oxford Co., Maine. Big beryls are found here.

National Museum at Washington, D.C.

In any of the local gem shops one may see a representative collection of the pegmatite minerals, but their prices are high and one might better have the fun of collecting his own material and getting better specimens. Clark's Drug Store in Paris has a nice collection.

Collector's Kinks

Collectors are cordially invited to submit notes from their experiences and so make this department of interest to all.

I note that a great many amateur collectors are buying or making displays of fluorescent minerals using argon glow lamps. I have such a display and I have used the same type of lamp filled with neon to give a daylight contrast. I have a tin disc which separates the two lamps and by moving the disc I can get first the daylight and then the fluorescent effect without any switches. The neon has the same candlepower as the argon and thus the eye does not have to adjust itself as in the case where incandescent lights are used.

This note might be of interest to your readers.

ARTHUR KNAPP.

The Amateur Lapidary

Conducted by J. H. HOWARD*

504 Crescent Ave., Greenville, S. C.

Amateur and professional lapidaries are cordially invited to submit contributions and so make this department of interest to all.

*Author of—*The Working of Semi-Precious Stones.* A practical guide-book written in non-technical language for those who desire to cut and polish semi-precious stones.

CORUNDUM CABOCHONS

Cutting cabochons of corundum is a much slower job than any we have done with the softer stones, but it can be done with very little extra outlay for equipment. A diamond charged lap is ideal for the cutting but as few of us have this device we will proceed as best we can without it.

I will first list the steps of the operation and later comment on them.

1. Rough to shape with either a 100 carbo wheel or with 100 carbo powder on an iron lap.
2. Semi-smooth with FF carbo on iron lap.
3. Further smooth with FF carbo on lead or tin lap.
4. Finish grinding with 600 carbo on lead or tin lap.
5. Polish with tripoli on copper lap.

The quickest way to shape the stone is on a carborundum wheel. But the sapphire is so hard that it wears away the carbo at a very fast rate. Doing the job on an iron lap with paste of 100 carbo is slower but less costly than cutting away the carbo wheel.

Step 2 may be omitted though I think it pays to use it. The same iron lap may be used as was used for the 100 carbo by washing it.

Step 3. This or some corresponding operation must be used. Any grain of carbo from 220 to FFF is suitable. Tin or lead laps are equally good here and the lead is much cheaper.

Step 4 may be omitted. Some amateurs use it, others say it doesn't pay. Professionals do not use it.

Step 5. The polishing is slow. It requires a copper lap, powdered tripoli or rottenstone, and patience. A lap about 4" or 5" in dia. by ¼" thick is good. Its face must be well scarified. This is easily done by cutting a series of marks radially with a sharp point such as the tip of a dull knife blade. These cuts should be about ⅛" to ¼" apart.

All pastes in all operations are to be applied very freely and should be very thick. This includes the polishing paste. Some clay flour or tripoli mixed with the carbo powder will make it sticky and more effective.

Do not let the copper lap run dry in polishing.

Speed about 800 to 1000 rpm on all operations. Speed is not critical.

Pressure heavy on all cuttings—medium on polishing.

Both sapphire and ruby have "knots" in them; spots far harder than the rest of the stone. The slow cutting of these accounts for much of the time it takes to finish a stone.

Do not cut flat backs on any ruby or sapphire. If the stone has a star and the material is at all translucent, as much "stock" as possible should be left in the rear of the stone as it adds to the distinctness of the star. If the stone is wholly opaque, flattening the base will do no harm but neither will it do any good and the cabochon shape is easier to cut than the flat.

DIRECTORY OF CROOKS

We have a directory of Amateur Lapidaries. Why not a directory of crooks?

I used to think that the guild of gem cutters and collectors was unique in that it had no "crooks" in it. I still think the percentage of them is remarkably low but that we have them is impossible to deny.

In one case I sent a small package of Mineral specimens to a High School Instructor, at his invitation, in exchange for certain items he had or claimed to have. Have never heard from him again though I have twice written him for at least an acknowledgement.

One small shipment was to a High School Principal, on approval. He never paid and refuses to answer letters.

Another was to a Boy Scout Counselor. Circumstances same as above. (God pity the poor Boy Scouts counseled by a fellow like this).

I don't know if this method of minor thievery is general or not. But if any of our readers have suffered from it I suggest that they might be saved further losses to themselves and to their fellows by a proper exchange of information. I would be glad to compile and distribute such a list of those who have shown by past acts that they cannot be trusted in future transactions. Such list will of course not be published. It would be merrely such a list as local credit associations use for the protection of their members.

If the idea happens to have any interest for you, send in to me the names of those with whom you have had this trouble, with statement of the facts and request for the list. Be sure to send stamped envelope for reply, and wait possibly a month for the reply, giving me time to receive reports.

J. H. HOWARD.

Amateur Lapidary Directory

Mack, W. E., Clarinda, Iowa.

Mineral Oddities

Aluminum, the newest of our common metals, is the most widely distributed, being found as a silicate or an oxide in the majority of rocks. Yet all the metal is derived from bauxite; and in this way aluminum enjoys a unique position as being one of the few metals to be derived from a single ore. At the same time it is one of the very few not known to occur in its native state. Perhaps this accounts for it not being known until modern times. When first separated from its ore, the process made the metal so expensive that it was often used for jewelry.

Inexperienced prospectors often wonder why they haven't found a valuable deposit of aluminum ore when a sample of rock shows some 20 per cent or more of aluminum on chemical analysis. But so far the metal can only be obtained commercially from bauxite, the oxide of aluminum.

Merry Christmas

TO ALL OUR READERS, FRIENDS and PATRONS

IS THE WISH OF

THE EDITOR and PUBLISHER of ROCKS and MINERALS

Bibliographical Notes

Minerals Yearbook - 1934: By O. E. Kiessling, Chief Economist, Division of Mineral Statistics, U. S. Bureau of Mines, 1154 pp. For sale by the U. S. Government Printing Office, Washington, D. C., $1.75 (cloth).

The Minerals Yearbook, 1934, of the U. S. Bureau of Mines, is the second of the new series; it carries forward the statistical information and economic discussions of mining printed in various former publications, including Mineral Resources of the United States which was issued annually for half a century. The purpose in assembling basic information on minerals into one convenient volume, the reasons for changing the method of publication, and the position the volume occupies in relation to research in mining economics were set forth in the foreword to the Minerals Yearbook, 1932-33.

Recent Discoveries of Cambrian Beds in the Northwestern United States: By Charles Elmer Resser, Curator, Division of Invertebrate Paleontology, U.S. National Museum, 10 pp. Published by the Smithsonian Institution, Washington, D. C., as Publication 3284.

READERS' SECTION

Editor "R & M":

While going over some specimens from the Braun stock with the Argon bulbs, I came across something that puzzles me. This is a rock crystal about 1½ inches long with another rock crystal about 1 inch long attached to the pyramid and at right angles, forming a T. The junction between the two fluoresces a green almost like that of the Mexican hyalites. Naturally I suspected that the crystal had separated and had been joined again with some adhesive that fluoresces but I have tried water and alcohol and everything short of brute force and they do not come apart. I wonder if some reader can suggest some solvent that might do the trick as I can not help but believe they have been glued although the joint is so perfect I can find no visible evidence of it. The locality is given as "Drift, 47th St. near 5th Ave., Brooklyn.

A. J. HARSTAD.
Box 797, Helena, Mont.

Stephen Varni, Gem Expert of Maiden Lane, New York, and residing at 424 85th Street, Brooklyn, delivered a lecture at Paterson, New Jersey, High School No. 12 on December 5 subject was "Gems and Gem Minerals." He spoke about the Paterson mineral, Prehnite, which is a strictly local product and found at the New Street, Paterson, quarries, showing this Gem in the rough and in the cut form suitable for Jewelry and Necklaces.

His other subjects were Birthstones, Evolution of the Crystal Ball, Evolution of the Varnistar, Diamond Doublet Racket, and many Gem Anecdotes —also illustrated by lantern slides. Attendance 500.

General Index of Authors and Contents

Volume IX—1934

Jan.	1934	Vol. 9	No. 1,	Whole No. 31	pp. 1-12
Feb.	1934	9	2	32	13-28
March	1934	9	3	33	29-44
April	1934	9	4	34	45-60
May	1934	9	5	35	61-76
June	1934	9	6	36	77-92
July	1934	9	7	37	93-108
Aug.	1934	9	8	38	109-124
Sept.	1934	9	9	39	125-140
Oct.	1934	9	10	40	141-156
Nov.	1934	9	11	41	157-172
Dec.	1934	9	12	42	173-188

Reader's Section

Editor "R & M":

I like the present cover design. The different issues together in their various colors look very attractive.

May ROCKS and MINERALS prosper in the New Year; and a Happy New Year to the Editor.

MYRTLE G. MILLER

Ackermanville, Penn.

Editor "R & M":

In the interest of the study of minerals, I would like to suggest that you publish a query in the magazine as to which of the readers are interested in getting a copy of the U. S. Geological Survey Bulletin 624—Useful Minerals of the United States. The supply of this bulletin has been exhausted since 1921. Probably if enough people were interested in obtaining copies of the publication we could prevail upon the Director of the Survey to reprint it.

JOSEPH V. LYNSKEY,

Chicago, Ill.

Editor "R & M":

I wish to express my thanks for the service that one small ad gave me. I received many orders from all parts of the United States, and inquiries from various countries of Europe and elsewhere. Your little magazine is just what I have been looking for. I read everything in it. Even the advertisements are instructive.

FRANK DUNCAN.

Terlingua, Texas.

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EXCHANGES

SOAPSTONE AND PYRITE. FRIENDS AND Brother Collectors with whom I've had many pleasant exchanges. A Merry Xmas and Happy New Year, from Karl Proctor Perry, 32 New Park Ave., Hartford, Conn.

"RATTLE-BOX" CLAY GEODES. OTHER specimens to exchange. What have you? Send list to Alex Glasser, 305 George St., New Brunswick, N. J.

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